

# SEQUENCE LISTING

<110> Shizuo AKIRA  
Takahiro SHIMADA

<120> IDENTIFICATION OF NOVEL SUBSTRATE I-TRAF  
OF IKK-i KINASE

<130> 49862 (71526)

<140> 09/582,397

<141> 2000-06-24

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<170> FastSEQ for Windows Version 3.0

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<211> 2154

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| ctgccagtgt  | gtacaaggcc | cgcaacaaga | aatccggaga | gctggttgct | gtgaagggtct | 120  |
| tcaacactac  | cagctacctg | cggccccg   | agggtgcagg | gagggagttt | gaggtcctgc  | 180  |
| ggaagctgaa  | ccaccagaac | atcgtcaagc | tctttgcggt | ggaggagacg | ggcggaagcc  | 240  |
| ggcagaaggt  | actggtgatg | gagtactgct | ccagtgggag | cctgctgagt | gtgctggaga  | 300  |
| gccctgagaa  | tgcctttggg | ctgcctgagg | atgagttcct | ggtggtgctg | cgctgtgtgg  | 360  |
| tggccggcat  | gaaccacctg | cgggagaacg | gcattgtgca | tcgcgacatc | aagccgggga  | 420  |
| acatcatgcg  | cctcgtaggg | gaggaggggc | agagcatcta | caagctgaca | gacttcggcg  | 480  |
| ctgcccggga  | gctggatgat | gatgagaagt | tcgtctcggt | ctatgggact | gaggagtacc  | 540  |
| tgcattcccga | catgtatgag | cgggcgggtg | ttcgaaagcc | ccagcaaaaa | gcgttcgggg  | 600  |
| tgactgtgga  | tctctggagc | attggagtga | ccttgtacca | tgcagccact | ggcagcctgc  | 660  |
| ccttcatccc  | ctttggtggg | ccacggcgga | acaaggagat | catgtaccgg | atcaccacag  | 720  |
| agaagccggc  | tggggccatt | gcaggtgccc | agaggcgga  | gaacgggccc | ctggagtggga | 780  |
| gctacaccct  | ccccatcacc | tgccagctgt | cactggggct | gcagagccag | ctggtgcca   | 840  |
| tcttgccaa   | catcctggag | gtggagcagg | ccaagtgtg  | gggcttcgac | cagttctttg  | 900  |
| cggagaccag  | tgacatcctg | cagcgagttg | tcgtccatgt | cttctccctg | tcccaggcag  | 960  |
| tcttgacca   | catctatatc | catgccaca  | acacgatagc | cattttccag | gaggccgtgc  | 1020 |
| acaagcagac  | cagtgtggcc | ccccgacacc | aggagtacct | ctttgagggt | cacctctgtg  | 1080 |
| tcctcgagcc  | cagcgtctca | gcacagcaca | tcgcccacac | gacggcaagc | agccccctga  | 1140 |
| ccctcttcag  | cacagccatc | cctaaggggc | tggccttcag | ggaccctgct | ctggacgtcc  | 1200 |
| ccaagtctgt  | ccccaaagtg | gacctgcagg | cggattacaa | cactgccaag | ggcgtgttgg  | 1260 |
| gcgccggcta  | ccaggccctg | cggttggcac | gggccctgct | ggatgggcag | gagctaagt   | 1320 |
| ttcgggggct  | gcactgggtc | atggaggtgc | tccaggccac | atgcagacgg | actctggaag  | 1380 |
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| ggactctagc  | ggaggtcctc | tccagatgct | ccaaaaatat | cacggagacc | caggagagcc  | 1560 |
| tgagcagcct  | gaaccgggag | ctggtgaaga | gccgggatca | ggtacatgag | gacagaagca  | 1620 |
| tccagcagat  | tcagtgtgtg | ttggacaaga | tgaacttcat | ctacaaacag | ttcaagaagt  | 1680 |
| ctaggatgag  | gccagggctt | ggctacaacg | aggagcagat | tcacaagctg | gataagggtga | 1740 |
| atttcagtca  | tttagccaaa | agactcctgc | agggtgtcca | ggaggagtgc | gtgcagaagt  | 1800 |
| atcaagcgtc  | cttagtcaca | cacggcaaga | ggatgagggt | ggtgcacgag | accaggaacc  | 1860 |
| acctgcgct   | ggttggctgt | tctgtggctg | cctgtaacac | agaagcccag | gggtccagg   | 1920 |
| agagtctcag  | caagctcctg | gaagagctat | ctcaccagct | ccttcaggac | cgagcaagg   | 1980 |

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 Glu Leu Val Ala Val Lys Val Phe Asn Thr Thr Ser Tyr Leu Arg Pro  
 35 40 45  
 Arg Glu Val Gln Val Arg Glu Phe Glu Val Leu Arg Lys Leu Asn His  
 50 55 60  
 Gln Asn Ile Val Lys Leu Phe Ala Val Glu Glu Thr Gly Gly Ser Arg  
 65 70 75 80  
 Gln Lys Val Leu Val Met Glu Tyr Cys Ser Ser Gly Ser Leu Leu Ser  
 85 90 95  
 Val Leu Glu Ser Pro Glu Asn Ala Phe Gly Leu Pro Glu Asp Glu Phe  
 100 105 110  
 Leu Val Val Leu Arg Cys Val Val Ala Gly Met Asn His Leu Arg Glu  
 115 120 125  
 Asn Gly Ile Val His Arg Asp Ile Lys Pro Gly Asn Ile Met Arg Leu  
 130 135 140  
 Val Gly Glu Glu Gly Gln Ser Ile Tyr Lys Leu Thr Asp Phe Gly Ala  
 145 150 155 160  
 Ala Arg Glu Leu Asp Asp Asp Glu Lys Phe Val Ser Val Tyr Gly Thr  
 165 170 175  
 Glu Glu Tyr Leu His Pro Asp Met Tyr Glu Arg Ala Val Leu Arg Lys  
 180 185 190  
 Pro Gln Gln Lys Ala Phe Gly Val Thr Val Asp Leu Trp Ser Ile Gly  
 195 200 205  
 Val Thr Leu Tyr His Ala Ala Thr Gly Ser Leu Pro Phe Ile Pro Phe  
 210 215 220  
 Gly Gly Pro Arg Arg Asn Lys Glu Ile Met Tyr Arg Ile Thr Thr Glu  
 225 230 235 240  
 Lys Pro Ala Gly Ala Ile Ala Gly Ala Gln Arg Arg Glu Asn Gly Pro  
 245 250 255  
 Leu Glu Trp Ser Tyr Thr Leu Pro Ile Thr Cys Gln Leu Ser Leu Gly  
 260 265 270  
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 275 280 285  
 Gln Ala Lys Cys Trp Gly Phe Asp Gln Phe Phe Ala Glu Thr Ser Asp  
 290 295 300  
 Ile Leu Gln Arg Val Val Val His Val Phe Ser Leu Ser Gln Ala Val  
 305 310 315 320  
 Leu His His Ile Tyr Ile His Ala His Asn Thr Ile Ala Ile Phe Gln  
 325 330 335  
 Glu Ala Val His Lys Gln Thr Ser Val Ala Pro Arg His Gln Glu Tyr  
 340 345 350  
 Leu Phe Glu Gly His Leu Cys Val Leu Glu Pro Ser Val Ser Ala Gln  
 355 360 365  
 His Ile Ala His Thr Thr Ala Ser Ser Pro Leu Thr Leu Phe Ser Thr

|                         |                     |                     |
|-------------------------|---------------------|---------------------|
| 370                     | 375                 | 380                 |
| Ala Ile Pro Lys Gly Leu | Ala Phe Arg Asp Pro | Ala Leu Asp Val Pro |
| 385                     | 390                 | 395                 |
| Lys Phe Val Pro Lys Val | Asp Leu Gln Ala Asp | Tyr Asn Thr Ala Lys |
| 405                     | 410                 | 415                 |
| Gly Val Leu Gly Ala Gly | Tyr Gln Ala Leu Arg | Leu Ala Arg Ala Leu |
| 420                     | 425                 | 430                 |
| Leu Asp Gly Gln Glu Leu | Met Phe Arg Gly Leu | His Trp Val Met Glu |
| 435                     | 440                 | 445                 |
| Val Leu Gln Ala Thr Cys | Arg Arg Thr Leu Glu | Val Ala Arg Thr Ser |
| 450                     | 455                 | 460                 |
| Leu Leu Tyr Leu Ser Ser | Ser Leu Gly Thr Glu | Arg Phe Ser Ser Val |
| 465                     | 470                 | 475                 |
| Ala Gly Thr Pro Glu Ile | Gln Glu Leu Lys Ala | Ala Ala Glu Leu Arg |
| 485                     | 490                 | 495                 |
| Ser Arg Leu Arg Thr Leu | Ala Glu Val Leu Ser | Arg Cys Ser Gln Asn |
| 500                     | 505                 | 510                 |
| Ile Thr Glu Thr Gln Glu | Ser Leu Ser Ser Leu | Asn Arg Glu Leu Val |
| 515                     | 520                 | 525                 |
| Lys Ser Arg Asp Gln Val | His Glu Asp Arg Ser | Ile Gln Gln Ile Gln |
| 530                     | 535                 | 540                 |
| Cys Cys Leu Asp Lys Met | Asn Phe Ile Tyr Lys | Gln Phe Lys Lys Ser |
| 545                     | 550                 | 555                 |
| Arg Met Arg Pro Gly Leu | Gly Tyr Asn Glu Glu | Gln Ile His Lys Leu |
| 565                     | 570                 | 575                 |
| Asp Lys Val Asn Phe Ser | His Leu Ala Lys Arg | Leu Leu Gln Val Phe |
| 580                     | 585                 | 590                 |
| Gln Glu Glu Cys Val Gln | Lys Tyr Gln Ala Ser | Leu Val Thr His Gly |
| 595                     | 600                 | 605                 |
| Lys Arg Met Arg Val Val | His Glu Thr Arg Asn | His Leu Arg Leu Val |
| 610                     | 615                 | 620                 |
| Gly Cys Ser Val Ala Ala | Cys Asn Thr Glu Ala | Gln Gly Val Gln Glu |
| 625                     | 630                 | 635                 |
| Ser Leu Ser Lys Leu Leu | Glu Glu Leu Ser His | Gln Leu Leu Gln Asp |
| 645                     | 650                 | 655                 |
| Arg Ala Lys Gly Ala Gln | Ala Ser Pro Pro Pro | Ile Ala Pro Tyr Pro |
| 660                     | 665                 | 670                 |
| Ser Pro Thr Arg Lys Asp | Leu Leu Leu His Met | Gln Glu Leu Cys Glu |
| 675                     | 680                 | 685                 |
| Gly Met Lys Leu Leu Ala | Ser Asp Leu Leu Asp | Asn Asn Arg Ile Ile |
| 690                     | 695                 | 700                 |
| Glu Arg Leu Asn Arg Val | Pro Ala Pro Pro Asp | Val                 |
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 <212> DNA  
 <213> Mouse

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| gaaatccggg gaggtggttg ctgtaaaggt cttcaactca gccagctatc ggcgacctcc  | 180 |
| tgaggttcag gtgaggaggt ttgaggtcct gcggaggctg aatcaccaga acatcgtgaa  | 240 |
| gctattcgca gtggaggaaa cgggaggcag ccggcagaag gtgctaata tggagtactg   | 300 |
| ctccagtggg agcctgctga gcgtgctgga agaccctgag aacacgttcg ggctttctga  | 360 |
| agaggagttc ctagtggtgc tgcgctgtgt ggtggctggc atgaaccacc tgcgggagaa  | 420 |

|             |            |             |             |             |            |      |
|-------------|------------|-------------|-------------|-------------|------------|------|
| tggcattgtc  | catcgggaca | tcaaacctgg  | gaacatcatg  | cgcttgggtg  | gcgaggaggg | 480  |
| gcagagcatc  | tataagctgt | ctgacttcgg  | ggctgcccgc  | aagctggacg  | atgatgagaa | 540  |
| gtttgtttct  | gtctatggta | cagaggaata  | cctgcaccct  | gacatgtatg  | agcgtgcagt | 600  |
| gctgcgcaaa  | ccccagcaaa | aggcatttgg  | tgtgactgtg  | gatctctgga  | gtattggggg | 660  |
| gacctgtac   | cacgcagcca | caggcagtct  | gcccttcacg  | cccttcgggtg | ggccccggcg | 720  |
| caacaaagag  | atcatgtaca | gaatcaccac  | agagaagcca  | gccggggcca  | tttcagggac | 780  |
| tcagaagcag  | gaaaatggtc | ccttggagtg  | gagctacagc  | ctcccatca   | cctgtagact | 840  |
| gtccatgggg  | ctgcagaacc | agctgggtgc  | catcctggcc  | aacatcctgg  | aggtggaaga | 900  |
| ggataagtgc  | tggggccttt | atcagttctt  | cgcggagacc  | agtgcattc   | tgcagcgaac | 960  |
| ggatcatccac | gtcttttccc | tacccagggc  | cgttttgcac  | catgtctaca  | tccacgcccc | 1020 |
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| catcgcccac  | acagctgcca | gcagccctct  | aactctgttc  | agcatgtcca  | gcgacacacc | 1200 |
| taaggggctg  | gccttcaggg | accctgctct  | ggatgtccca  | aagttcgtcc  | ctaaggttga | 1260 |
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| cagctacaat  | gaggagcaga | tccacaagct  | ggataaggta  | aatttcagtc  | atctagccaa | 1800 |
| gaggctgctg  | cagggtgttc | aggaggagtg  | tgtgcagacg  | tatcaggtgt  | cgctgggtcc | 1860 |
| acacggcaag  | cggatgaggc | aggtgcagag  | ggccagaac   | cacctgcac   | tcattggcca | 1920 |
| ctctgtggcc  | acctgtaact | cggaaagccc  | gggagcccag  | gagagtctga  | acaagatctt | 1980 |
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| tagagtcca   | tcggcaccag | atgtctgagc  | tccttggggg  | ttcacaaggc  | actcagaagc | 2220 |
| aatagaaaca  | ttcatattgt | accctacac   | tgtgagacca  | aattcagggc  | aagttctggg | 2280 |
| tccatctcac  | tagcctacct | ccctcttggc  | cattggccat  | tggccaacaa  | actagcatta | 2340 |
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| ttcccaggac  | cagcaggcat | ctcctgtggc  | ttctcctgcc  | tctccagggt  | gctggatcag | 2580 |
| aatgcttatt  | cttcgttgtt | tcctgtgctg  | tttcttgagt  | gtccccatcc  | cctggcctca | 2640 |
| ggcaaccac   | aaacggcccc | tctgtgcttg  | gtctagatgc  | acctgcattt  | gagaaagtgg | 2700 |
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| cttggttcta  | agaaacagct | ggtcagtatc  | aaccacagcc  | atgctaactg  | gacagatgtt | 2820 |
| ggaacccaaa  | gtcctaagga | gagagcaggc  | ctgcaccttc  | agacatggaa  | taaatacatc | 2880 |
| gccttttctg  | tttaaaaaaa | aaaaaaaaaa  |             |             |            | 2910 |

<210> 4

<211> 717

<212> PRT

<213> Mouse

<400> 4

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| Met | Gln | Ser | Thr | Thr | Asn | Tyr | Leu | Trp | His | Thr | Asp | Asp | Leu | Leu | Gly |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     | 15  |     |     |
| Gln | Gly | Ala | Thr | Ala | Ser | Val | Tyr | Lys | Ala | Arg | Asn | Lys | Lys | Ser | Gly |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Glu | Val | Val | Ala | Val | Lys | Val | Phe | Asn | Ser | Ala | Ser | Tyr | Arg | Arg | Pro |
|     |     |     | 35  |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Pro | Glu | Val | Gln | Val | Arg | Glu | Phe | Glu | Val | Leu | Arg | Arg | Leu | Asn | His |
|     |     |     | 50  |     |     |     | 55  |     |     |     |     | 60  |     |     |     |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Asn | Ile | Val | Lys | Leu | Phe | Ala | Val | Glu | Glu | Thr | Gly | Gly | Ser | Arg |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |
| Gln | Lys | Val | Leu | Ile | Met | Glu | Tyr | Cys | Ser | Ser | Gly | Ser | Leu | Leu | Ser |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Val | Leu | Glu | Asp | Pro | Glu | Asn | Thr | Phe | Gly | Leu | Ser | Glu | Glu | Glu | Phe |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Leu | Val | Val | Leu | Arg | Cys | Val | Val | Ala | Gly | Met | Asn | His | Leu | Arg | Glu |
|     |     | 115 |     |     |     |     |     | 120 |     |     |     | 125 |     |     |     |
| Asn | Gly | Ile | Val | His | Arg | Asp | Ile | Lys | Pro | Gly | Asn | Ile | Met | Arg | Leu |
| 130 |     |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Val | Gly | Glu | Glu | Gly | Gln | Ser | Ile | Tyr | Lys | Leu | Ser | Asp | Phe | Gly | Ala |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Ala | Arg | Lys | Leu | Asp | Asp | Asp | Glu | Lys | Phe | Val | Ser | Val | Tyr | Gly | Thr |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |
| Glu | Glu | Tyr | Leu | His | Pro | Asp | Met | Tyr | Glu | Arg | Ala | Val | Leu | Arg | Lys |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Pro | Gln | Gln | Lys | Ala | Phe | Gly | Val | Thr | Val | Asp | Leu | Trp | Ser | Ile | Gly |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Val | Thr | Leu | Tyr | His | Ala | Ala | Thr | Gly | Ser | Leu | Pro | Phe | Ile | Pro | Phe |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |
| Gly | Gly | Pro | Arg | Arg | Asn | Lys | Glu | Ile | Met | Tyr | Arg | Ile | Thr | Thr | Glu |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |
| Lys | Pro | Ala | Gly | Ala | Ile | Ser | Gly | Thr | Gln | Lys | Gln | Glu | Asn | Gly | Pro |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |
| Leu | Glu | Trp | Ser | Tyr | Ser | Leu | Pro | Ile | Thr | Cys | Arg | Leu | Ser | Met | Gly |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     | 270 |     |     |     |
| Leu | Gln | Asn | Gln | Leu | Val | Pro | Ile | Leu | Ala | Asn | Ile | Leu | Glu | Val | Glu |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Glu | Asp | Lys | Cys | Trp | Gly | Phe | Asp | Gln | Phe | Phe | Ala | Glu | Thr | Ser | Asp |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |
| Ile | Leu | Gln | Arg | Thr | Val | Ile | His | Val | Phe | Ser | Leu | Pro | Gln | Ala | Val |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |
| Leu | His | His | Val | Tyr | Ile | His | Ala | His | Asn | Thr | Ile | Ala | Ile | Phe | Leu |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Glu | Ala | Val | Tyr | Glu | Gln | Thr | Asn | Val | Thr | Pro | Lys | His | Gln | Glu | Tyr |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Leu | Phe | Glu | Gly | His | Pro | Cys | Val | Leu | Glu | Pro | Ser | Leu | Ser | Ala | Gln |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| His | Ile | Ala | His | Thr | Ala | Ala | Ser | Ser | Pro | Leu | Thr | Leu | Phe | Ser | Met |
|     | 370 |     |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |
| Ser | Ser | Asp | Thr | Pro | Lys | Gly | Leu | Ala | Phe | Arg | Asp | Pro | Ala | Leu | Asp |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Val | Pro | Lys | Phe | Val | Pro | Lys | Val | Asp | Leu | Gln | Ala | Asp | Tyr | Ser | Thr |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Ala | Lys | Gly | Val | Leu | Gly | Ala | Gly | Tyr | Gln | Ala | Leu | Trp | Leu | Ala | Arg |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Val | Leu | Leu | Asp | Gly | Gln | Ala | Leu | Met | Leu | Arg | Gly | Leu | His | Trp | Val |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Leu | Glu | Val | Leu | Gln | Asp | Thr | Cys | Gln | Gln | Thr | Leu | Glu | Val | Thr | Arg |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
| Thr | Ala | Leu | Leu | Tyr | Leu | Gly | Ser | Ser | Leu | Gly | Thr | Glu | Arg | Phe | Ser |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Ser | Gly | Ser | Gly | Met | Pro | Asp | Val | Gln | Glu | Arg | Lys | Glu | Ala | Thr | Glu |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Leu | Arg | Thr | Arg | Leu | Gln | Thr | Leu | Ser | Glu | Ile | Leu | Ser | Lys | Cys | Ser |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| His | Asn | Val | Thr | Glu | Thr | Gln | Arg | Ser | Leu | Ser | Cys | Leu | Gly | Glu | Glu |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 515 |     | 520 |     | 525 |     |     |     |     |     |     |     |     |     |     |
| Leu | Leu | Lys | Asn | Arg | Asp | Gln | Ile | His | Glu | Asp | Asn | Lys | Ser | Ile | Gln |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Lys | Ile | Gln | Cys | Cys | Leu | Asp | Lys | Met | His | Phe | Ile | Tyr | Lys | Gln | Phe |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| Lys | Lys | Ser | Arg | Met | Arg | Pro | Gly | Leu | Ser | Tyr | Asn | Glu | Glu | Gln | Ile |
|     |     |     | 565 |     |     |     |     |     | 570 |     |     |     |     | 575 |     |
| His | Lys | Leu | Asp | Lys | Val | Asn | Phe | Ser | His | Leu | Ala | Lys | Arg | Leu | Leu |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |
| Gln | Val | Phe | Gln | Glu | Glu | Cys | Val | Gln | Thr | Tyr | Gln | Val | Ser | Leu | Val |
|     | 595 |     |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |
| Thr | His | Gly | Lys | Arg | Met | Arg | Gln | Val | Gln | Arg | Ala | Gln | Asn | His | Leu |
|     | 610 |     |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| His | Leu | Ile | Gly | His | Ser | Val | Ala | Thr | Cys | Asn | Ser | Glu | Ala | Arg | Gly |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| Ala | Gln | Glu | Ser | Leu | Asn | Lys | Ile | Phe | Asp | Gln | Leu | Leu | Leu | Asp | Arg |
|     |     |     | 645 |     |     |     |     | 650 |     |     |     |     |     | 655 |     |
| Ala | Ser | Glu | Gln | Gly | Ala | Glu | Val | Ser | Pro | Gln | Pro | Met | Ala | Pro | His |
|     | 660 |     |     |     |     |     |     | 665 |     |     |     |     | 670 |     |     |
| Pro | Gly | Pro | Asp | Pro | Lys | Asp | Leu | Val | Phe | His | Met | Gln | Glu | Leu | Cys |
|     | 675 |     |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |
| Asn | Asp | Met | Lys | Leu | Leu | Ala | Phe | Asp | Leu | Gln | Asp | Asn | Asn | Arg | Leu |
|     | 690 |     |     |     |     | 695 |     |     |     |     | 700 |     |     |     |     |
| Ile | Glu | Arg | Leu | His | Arg | Val | Pro | Ser | Ala | Pro | Asp | Val |     |     |     |
| 705 |     |     |     |     | 710 |     |     |     |     |     | 715 |     |     |     |     |